



March 13, 2001

To: Trans-Lake Washington Project Executive, Technical and Advisory Committees

From: Barbara Gilliland, Sound Transit
Trans-Lake Washington Project Manager

Re: SR 520 Light Rail Connections to the Central Link Corridor

The Trans-Lake Project EIS process now underway includes high capacity transit alternatives in the I-90, SR 520 and Mid-lake corridor. A question has been raised regarding whether a light rail alternative across Lake Washington in the SR 520 corridor could be connected to the Central Link light rail system now in design.

Sound Transit's review of this question concluded that long-range systems operations of any east/west extensions in the SR 520 corridor would require a separate corridor into downtown Seattle, as opposed to merging with the Central line.

LONG RANGE TRANSIT DEMAND

In the spring of 1999 and fall of 2000, Sound Transit updated 2020 ridership forecasts for a rail system with full implementation of the agency's adopted Long Range Vision. This Vision identifies potential rail extensions north to Everett, south to Tacoma and across Lake Washington into east King County.

The forecast 2020 maximum passenger loads on the North, South and East line all occur in-bound to downtown Seattle in the morning and outbound in the afternoon. The forecast volumes are:

- North line: 11,000 passengers per hour
- South line: 5,600 passengers per hour
- East line: 5,000 passenger per hour

The forecast volumes on these lines would make their peak period ridership among the highest in North America. The especially high ridership on the North line reflects the density of the activity centers it serves. The neighborhoods along the corridor between Northgate and downtown Seattle -- such as the University District, First Hill and Capitol Hill -- are among the highest transit generators in the region. While there is uncertainty in any long-range forecast, observations of existing bus ridership in the region confirm the relative strength of the north corridor as compared to the south and east corridors.

Washington State Dept.
of Transportation
Office of Urban Mobility
401 Second Avenue South, Ste. 300
Seattle, Washington 98104
Phone # 206-464-5878
Fax # 206-464-6234

Sound Transit
401 South Jackson Street
Seattle, Washington 98104
Phone # 206-398-5000
Fax # 206-398-5215

CENTRAL LINK CAPACITY

Sound Transit is purchasing double articulated light rail cars, which may be coupled into up to four car trains without exceeding the 400' station platform lengths in the downtown Seattle transit tunnel. Each articulated light rail car has 74 seats and comfortable standing room for another 63 passengers for a total of 137 passengers. The Central Link light rail signal system will have a 90 second design headway (train spacing) and 120 second operating headway, or up to 30 trains per hour per direction.

At peak operations, running 30 four car trains per hour with 137 passengers per car would provide a capacity of up to 16,440 passengers per hour per direction. This places the capacity of the Central Link system well above most light rail systems, where train lengths and headways are often restricted by at-grade operations through central business districts, but at the low end of heavy rail systems, which often have 600 to 900-foot long station platforms.

LIGHT RAIL ON I-90

If light rail were extended across Lake Washington on I-90, the East and South lines would merge just south of the International District Station in downtown Seattle. The combined volumes on these lines would equal 10,600 passengers per hour and would evenly balance the 11,000 passenger per hour entering the downtown tunnel on the North line.

Assuming full-build out in 2020, trains could operate every 2.5 minutes through the downtown Seattle tunnel with a mix of three and four car trains. Half the trains would continue through to the South corridor and half would split to the East across I-90.

With this operations plan, the regional rail system would have the ability to accommodate nearly a 50% growth in ridership beyond the year 2020 by shortening headways through the downtown Seattle tunnel from 2.5 to 2 minutes and lengthening all trains to four cars.

LIGHT RAIL ON SR 520

If light rail were extended across Lake Washington in the SR 520 corridor and the East and North lines were merged north of downtown Seattle, the combined volumes of these two lines would approach 14,000 passengers per hour in the year 2020.

This demand could be accommodated in 2020 by running trains every 2 minutes through downtown Seattle and using maximum four car trains north of the University District. However, with this operations pattern, the north line would have very little capacity for growth beyond 2020, because trains would already be operating at their maximum frequency and length.

By constructing a new corridor to downtown Seattle, the SR 520 fixed-guideway alternatives analyzed by the Trans-Lake Project avoid the capacity problems raised by a merge with the Central line. The SR 520 lines extend into downtown Seattle with a transfer at the Westlake station, where aligning passengers from north-south trains create capacity for SR 520 passengers traveling south of Westlake.

CONCLUSIONS

Long-range systems operations would require that a light rail transit alternative in the SR 520 corridor be extended into downtown Seattle. However, a SR 520 system could be built initially from a transfer station in the University District to the Eastside. The second connection to downtown Seattle could be provided when required by system extensions and ridership growth. While this new corridor between downtown Seattle and the University District has high costs, it also has high ridership potential.

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